

as having only two. *C. complanata* varies much in size, and we have seen a specimen full of ova as small as *C. stagnalis* is described to be.

*C. hyalina*? We have taken a single specimen of a leech of this family, which nearly agrees with the descriptions of this species. It was more than twice as large as any other individual of this family which we have seen, being about an inch long, of a yellow-brown colour, with two rows of longitudinal dark lines upon its back. The whole body was remarkably hard and tough. We saw the proboscis of this animal well developed; it had no ova or young attached to it.

#### REFERENCE TO PLATE I.

- Fig. 1. H. geometra*, a pair united, mag. nat. 2. The fore-part of the same, magnified. *a, a.* White substance. 3. Eggs, mag. nat. 4. Young, idem. 5. Eggs, highly magnified (about 150 linear). *b.* Lid of the egg whence the leech escapes. 6. Anterior disc or sucker of the young, free, highly magnified. 8. The same attached. 7. Posterior disc attached.
- Fig. 9, 10, 11. Eggs or capsules with ova of Nephelis vulgaris.* 9. Mag. nat. 10, 11. Magnified. 12. The same, the ova near hatching. 13, 14. The same, with the young in the egg just before they come out.
- Fig. 15. Nephelis tessellata?* mag. nat., with the young adhering. 16. The same, upper side. 17. One of the young, highly magnified.
- Fig. 18, 19. Clepsina complanata*, mag. nat., with the ova attached.
- Fig. 20. C. hyalina?* mag. nat.

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### III.—Contributions to the Ichthyology of Australia. By JOHN RICHARDSON, M.D., F.R.S., &c., Inspector of Hospitals, Haslar.

MR. GOULD having had the kindness to place in my hands for examination a collection of fish, procured by his assistant Mr. Gilbert, at Port Essington, on the north coast of New Holland, I purpose in the following paper to give a summary of my observations thereon, together with a few remarks upon some drawings made by Lieutenant Emery, R.N., of fish captured on the north-west coast of the same country. I shall also introduce several notices of species from Van Diemen's Land and New Zealand, now existing in the museum at Haslar, with the view of enumerating as many Australian fish as the materials in my possession enable me to do.

Mr. Gilbert's specimens, numbered from 1 to 37, are all dried skins of one side of the fish. The colours of most are consequently altered, and in a few instances the vomerine and

palatine bones have been cut away, but in other respects they are in excellent condition. Lieut. Emery not being an ichthyologist, has sometimes omitted to portray the minute serratures of the opercular pieces, and has not always distinguished the spinous from the articulated rays. On this account it is difficult to fix the genus of the undescribed species; but the drawings exhibit no mean share of artistical skill, and, judging from the few known species among them, are correct representations of the recent fish, and consequently valuable records of their real tints of colour. In preparing the following notes, I have availed myself as often as my professional avocations and residence at a distance from London would allow, of the valuable collection of drawings made in Cook's first and second voyages by Parkinson and Forster, now in the Banksian library. Many of these figures are referred to in the posthumous edition of Bloch by Schneider, and also in the 'Histoire des Poissons'; and it may be advantageous to mention, that the mode in which the fin-rays are noted in pencil at the bottom of the drawings, viz. by putting the number of spinous rays as the numerator, and the whole number of rays of each fin, both spinous and articulated, as the denominator of a fraction, has sometimes led the authors of the works just named into error, the denominator being quoted as the amount of the soft rays alone. In most instances, however, the quotation is correctly made.

Mr. Gould destines his collection for the British Museum.

APOGON APRION (Nob.), Rough-tongued Apogon.

No. 11. Mr. Gilbert's list.

Mr. Gilbert states that the aborigines name this fish 'Munduruk,' and that it is a very local species, having hitherto been seen only in King's River (near Victoria, Port Essington), and not in the other very similar and closely adjacent streams. The species seems to differ from all those described in the 'Histoire des Poissons,' in the total absence of serratures on the preoperculum, and in the presence of a small cluster of teeth on the tongue.

It is more compressed than the *A. rexmullorum*, but does not differ much from that fish in the general form of its profile. Its height in the middle is contained three times and a half in the total length, caudal included. The length of the head exceeds the height of the body, and the thickness is greatest at the gill-covers, being there equal to about half the height behind the ventrals. The muzzle is also wide at the preorbitals. The preoperculum has the raised acute edges posteriorly and inferiorly, proper to the genus; there is a less conspicuous ridge on the foremost border of the operculum,

and they are all perfectly smooth. The operculum exhibits no vestige of a spine, but its broad membranous border is supported by a thin, narrow, cartilaginous rib, which runs out from the suboperculum. The teeth form pretty broad and densely villiform bands on the jaws, the posterior ones near the symphysis being a little longer, but all are short. On the vomer and palatine bones these teeth are very short, and there is a small cluster in the middle of the tongue which is just perceptible to the naked eye, and very sensible to the finger. The pharyngeal teeth are not longer than those in the jaws.

RAYs:—B. 7 — 7; D. 5|— 1|10; A. 2|9; C. 15 $\frac{1}{4}$ ; V. 1|5; P. 11.

The branchiostegous rays are very slender.

The dorsal commences over the anterior third of the pectorals, and rather before the middle of the ventrals. The first spine is very short and acute; the second is the longest and strongest, and tapers suddenly at the top, which is slightly curved; the third is a little shorter, and the fifth is half the length of the second. This fin has a smaller number of rays than is ascribed to any other species in the 'Histoire des Poissons.' They are alike in our two specimens. The spine of the second dorsal is not quite half as long as the soft rays. The first anal spine is barely perceptible, and the second spine and soft rays are shorter than those of the second dorsal. The ventrals are scarcely shorter than the pectorals, and are attached a little further forwards. The spine is one-third shorter than the soft rays. The caudal is rounded; it has fifteen forked rays and four graduated, simple, jointed ones above and below.

The collection contains two specimens—one dried, the other in spirits, neither of them retaining much of their original colours. There are no traces of any stripes on the body, or caudal spots having ever existed. The upper parts appear to have been dark in colour, gradually softening off towards the belly. The specimen in spirits exhibits faintly the hue of the grounds of Port wine, which probably was diffused over the head and upper part of the body. The fins appear dark. These traces of colour agree with the tints of *Ap. nigripinnis* or *vinosus*, but the number of dorsal rays is different. The only previously known New Holland species is banded (*Mullus fasciatus*, White).

The scales are orbicular or widely oval, with about twenty furrows and corresponding marginal crenatures on the basal half of the circle, radiating from towards the centre, but not reaching it, and a narrow chequered border with very minute teeth exteriorly. The lateral line has nearly the curve of the back, and changes to a straight course through the tail very gradually. It is composed of forty scales, each having a simple but rather uneven elevated tube on its surface. There are two scales on the base of the caudal, beyond the termination of the lateral line. The two central rays of the caudal diverge rather more at their bases than the other rays, thus dividing the fin into two parts. There are five rows of scales above the lateral line, and about thirteen below it, under the first dorsal.



DIMENSIONS.		inches. lines.	
Length from intermaxillary symphysis to extremity of caudal .		6	0
_____ base of caudal .....		4	9½
_____ anal fin .....		3	4
_____ first dorsal .....		2	3
_____ tip of gill-flap .....		1	11½
_____ edge of orbit .....		0	5¾
Diameter of orbit .....		0	5½
Length of second spine of first dorsal .....		0	8
_____ rays of soft dorsal .....		1	0
_____ rays of anal .....		0	10
_____ pectorals .....		1	1
_____ ventrals .....		1	0
Height of body .....		1	8
Thickness at gill-cover and nape .....		0	9
Length of caudal fin .....		1	2½

### SERRANUS LEPIDOPTERUS (Nob.), Butterfly-barber.

"*Perca lepidoptera*, J. R. Forsteri, MSS.," Schn.

*Epinephelus lepidopterus*, Bl. Schn., p. 302.

A drawing of a *Serranus* nearly related to *S. rasor* (Zool. Proceed., vol. ii.), made by a convict artist at Port Arthur, Van Diemen's Land, under the inspection of Dr. Lhotsky, exhibits all the characters of the New Zealand fish described in Schneider's edition of Bloch under the appellation of *Epinephelus lepidopterus*, except that there is some discrepancy in the numbers of the fin-rays.

The colour of the parts above the lateral line is clove-brown, which lower down gradually softens into brownish-red, and towards the belly changes to a dilute roseate tint. The scales forming the lateral line are truncated and smaller than the others, and have a rich umber-brown colour. Below the line the sides are thickly dotted to about half-way down with small irregular umber-brown spots, of different degrees of intensity. Under the posterior third of the soft dorsal, about the middle of the height, there is a large rectangular brownish-black mark. The top of the head and upper part of the operculum are tinted with clove-brown, approaching to lead-gray; there is a pale orange-brown bar crossing the preorbital to the anterior angle of the eye, and the membranous parts about the mouth have a sky-blue hue. There are some dark shades on the preoperculum, and a patch of orange-brown on the interoperculum. The dorsal fin is coloured with a mixture of more red than the adjoining part of the back; the caudal is scarlet, with a tinge of orange-brown at the base and along the edge of the forked membrane. The pectorals, ventrals and anal are rose-red, the rays being more deeply coloured than the membrane, and there are a few very pale reddish-brown spots on the pectoral.

A curved canine tooth is represented on the middle of each limb of the lower jaw, and the maxillary is densely scaly, as well as the snout, cheeks, and all the opercular pieces. The preoperculum has a rectangular form, with the angle rounded, and the whole margin is

represented as ciliated. Two conspicuous, flat, triangular spines are shown on the operculum, and the edge of bone is rounded away in a semi-circular arc, to a small angle adjoining the top of the gill-opening. The pectoral is large, and has an oval outline, its central rays reaching as far back as the anterior third of the anal. The ventrals are also large, and reach to the anal. The second anal spine is the largest of the three. The spinous dorsal moves in a densely scaly integument, there being only a triangular piece of smooth membrane behind the top of each spine. The base of the soft dorsal is also scaly, but the scales are not represented as advancing far on the anal. The caudal is forked to the depth of one-third of its length.

RAYs :—D. 10/14; A. 3/7; P. 12; V. 1/5 or 6; C. 15 :—Figure.

D. 10/20; A. 3/9; P. 16; V. 1/6; C. 18 :—Schneider.

The vertical height of the body is equal to one-half the length of the fish, caudal excluded; the length of the caudal being equal to two-thirds of the height of the body.

The total length of the figure, which is said to be of the natural size of the fish, is eleven inches.

### SERRANUS GILBERTI (Nob.), Gilbert's Serranus.

No. 18. Mr. Gilbert's collection.

This fish is stated by Mr. Gilbert to inhabit deep rocky places near the entrance of the harbour of Port Essington. It belongs to the group of spotted *Serrani*, of which the *Merra* (Bl. 329.) is a typical species. The members of this group are characterized in the 'Histoire des Poissons' by the various combinations they exhibit in the forms and denticulations of the opercular pieces, the development of scales on the jaws, the form of the dorsal fin, and the distribution of spots on the body and fins. The phrases by which their peculiarities are described, though sufficient to distinguish the species that the authors of the work had actually under observation, are inadequate, in the absence of correct figures, for the purposes of the ichthyologist who desires to characterize fully the new species or varieties which may fall under his notice. These must, therefore, be proposed with some degree of hesitation, until an opportunity offers for comparing the specimens with ascertained examples of known species. The Port Essington fish, which I have named after Mr. Gilbert, exhibits characters which I do not find combined in any *Serranus* described in the 'Histoire des Poissons.'

Upper jaw and maxillaries destitute of scales; the lower jaw and snout clothed with minute ones. Ascending limb of the preoperculum arched, finely toothed, and having a small slightly projecting lobe at the angle, armed with five or six somewhat larger teeth: the under edge of the bone is straight, and almost entire, there being only some very indistinct crenatures perceptible by the aid of a lens.

The suboperculum and interoperculum have entire margins. The upper opercular spine is scarcely visible through the skin of the dried specimen; the acute point is all that shows of the under one: the middle one is flat but pointed, and conspicuous enough. The third dorsal spine is the highest, and equals the tallest of the soft rays; the others decrease very little in height, the last or eleventh being only one-fifth shorter than the third, and nearly equal to the second: the first is half the height of the third. The soft dorsal, like the anal, is highest posteriorly, and both are moderately rounded. The anal spines are strong, more particularly the second, which is also rather the longest, and equal to the second dorsal spine in height. Caudal much rounded.

RAYS:—P. 17; V. 1½; D. 11½; A. 3½; C. 15½.

The head forms somewhat less than one-third of the total length, caudal fin included. Teeth on the jaws brush-formed, and, as in most of the allied species, taller and more slender posteriorly. The anterior row is short and conical, but, with the exception of one or two small canine teeth near the symphysis, it is concealed by the lips.

The whole body and the vertical fins are covered with round, dark, umber-brown spots, which correspond in size with those of *Serranus faveatus*. The ground-colour is paler, and on the back and sides appears like the threads of net, with round or slightly hexagonal meshes, enclosing the dark round spots, which are largest on the shoulders, and smaller on the tail and towards the belly. A space between the gill-openings and anus, beneath the level of the pectorals, is spotless, and was seemingly white in the recent fish. There are about a dozen spots in a row, between the gill-opening and caudal fin. No distinct spots are visible on the head; but some parts round the eye, about the jaws, and the edges of the pieces of the gill-cover are darker than the rest. There are also some darker shades towards the tips of the pectoral and ventral rays, but no spots on these fins. There are four rows of spots on the dorsal, the smallest on the edge of the fin, and the largest along the base. On the spinous portion of the fin the spots are less distinct, and the highest row forms merely a black speck on the notched membrane behind the tip of each spine. The anal is similarly marked: on the caudal there are about six rows of spots.

The scales of the body are moderate in size, or they may be designated as rather small, and they are much ciliated. Very minute scales cover the membranes of the fins, and even encroach on the rays.

*Serranus merra*, judging from what is said of it in the 'Histoire des Poissons,' differs from the above in having scaly jaws, a rounded preoperculum, very pointed opercular spines, in wanting spots on the spinous part of the dorsal, and in the numbers of the rays being different. *S. faveatus* approaches nearer to our specimen in the numbers of its rays and in the size of its spots, but it has four large dark spots at the base



of the dorsal and an odd one on the top of the trunk of the tail; whereas *S. Gilberti* has a series of twelve spots running along the base of the spinous and soft dorsal to the caudal, smaller, though darker, than those on the body. *S. hexagonatus* has the same large spots along the dorsal with *faveatus*, the same number of rays, and is further distinguished by white dots on the body. Its second anal ray is stated to be long and pointed. In *S. Gilberti* the second spine is decidedly the strongest, but it scarcely exceeds the third one in height. *S. ura* has a rounded preoperculum, equably denticulated on its margin. *S. maculosus*, as far as one can judge from the short description, scarcely differs from ours in form, except that it has two articulated rays fewer in the dorsal, and one in the anal. There are no spots on its caudal, but, as the only specimen noticed had been long kept in spirits, there is no great weight to be attached to their absence. *S. bontoo* has no spots on its fins. *S. suillus* has very strong spines at the angle of the preoperculum, and no spots on the dorsal.

This comparison of the species which come nearest to Mr. Gilbert's fish in the number of rays and general distribution of colours, shows that the latter differs as much from any one of them as they do from one another; and until an examination of many individuals at their native haunts has shown how far the rays may vary in the same species, and what changes may take place in the patterns of colour at different seasons, it will be most convenient to assign a distinctive name to the Port Essington fish. The analogy of the nuptial dress assumed by the *Salmonidæ* and other anadromous fish may prepare us to expect a very considerable variation in the brilliant tints of the *Serrani* on the approach of the spawning season. It is certainly desirable that new species should be proposed chiefly on the existence of some tangible peculiarities of external form or of internal structure; but to do this properly, the ichthyologist requires to have access to a well-filled museum.

## DIMENSIONS.

	inches. lines.	
Length from intermaxillary symphysis to extremity of caudal .	12	3
_____ base of ditto .....	9	10
_____ anus .....	5	9½
_____ tip of gill-flap .....	3	7
_____ of pectorals .....	2	4
_____ of ventrals .....	1	10
_____ of caudal .....	2	5
Height of the highest dorsal spine .....	1	4
_____ soft dorsal .....	1	4
_____ second anal spine .....	1	0
_____ soft anal .....	1	9

There are two *Serrani* in the museum at Haslar of unknown origin, though from some circumstances they are supposed to be from Melville Island, on the north coast of New Holland. One of them agrees so well with the account of the *S. merra* in the 'Histoire des Poissons,' that I have considered it to be an example of that common and somewhat variable species.

It differs from *S. Gilberti* in the head being rather longer in proportion, and forming exactly one-third of the entire length of the fish, caudal included; in the presence of some very minute scales on the limb of the maxillary, and in the very regular round spots being distributed over *every part* of the head, body, and fins. The ground-colour, after long maceration in spirits, has a pale leaden tint; the spots are dark umber-brown, and are smaller on the snout and lower jaw, and less crowded on the belly. There are but few on the ventrals, and on the pectorals they are small, though distinct, being confined to the rays, and forming about six rows. They are paler and less distinct on the spinous dorsal, but the fillet of membrane behind the tip of each spine is black. On the soft dorsal, anal and caudal, they are as in *S. Gilberti*, and the forms of these fins are the same. The opercular spines are more acute, but less conspicuous, particularly the middle one, which is nevertheless much larger than the other two, and the preoperculum is more rounded, both limbs being arched, without any distinct lobe at the moderately obtuse angle, above which, however, there is a slight re-entering curve. The ascending limb curves forwards considerably, and the lower one declines very slightly, so that the spherical angle which they form does not exceed a right one. The ascending limb is finely denticulated, with the teeth enlarging towards the angle; the lower one is faintly crenated. There is a canine tooth on each side of the symphysis above and below, but no exterior row of short conical teeth on the sides of the jaws. The bands of teeth on the limbs of the jaws, palate, and vomer are finer and more even than in *S. Gilberti*, approaching to villiform. The *second anal spine* is a little longer and much stronger than the third one. There is a further slight difference between the species, in the fourth and fifth dorsal spines of *merra* being rather taller than the third one. The soft dorsal is as tall as the highest spine; but the spines becoming shorter, though only a little, as they approach it, the soft fin appears taller than the spinous one, as is the case also in *S. Gilberti*. The under jaw of *S. merra* projects very evidently beyond the upper one, even when the mouth is shut. The scales of the body are small, and strongly ciliated.

RAYs:—P. 16; V. 1½; D. 11|16; A. 3|7, last ray deeply divided; C. 15¾.

Specimen 5½ inches long.

Bloch's figure 329 gives a good idea of the specimen above mentioned, though it does not exhibit the slight re-entering curve above the angle of the preoperculum.



## SERRANUS STELLANS (Nob.), Star-spotted Serranus.

This is the second *Serranus*, mentioned in a preceding page as belonging to the museum at Haslar, and as being supposed to have come from Melville Island, on the south side of Torres Straits.

The specimen bears a strong general resemblance to that which we have considered to be the *merra*, having the same distribution of the scales on the jaws, fins, &c., the same spines on the operculum and denticulations on the preoperculum, whose limbs form the same arcs; but the angle appears more rounded, from the absence of the small re-entering curve above it: the crenatures on the under limb are also more readily discovered. The teeth are rather more brush-like and unequal than in the *merra*, but the canines are the same,—a pair above and below. The under jaw is shorter, being just equal with the upper one when the mouth is closed. The dorsal is less arched anteriorly, the spines diminishing more gradually after the fifth, which is the tallest. From this cause the soft fin seems to be lower in proportion than in *merra*, but its posterior third actually equals the highest spine in height. The spines generally are more slender, and somewhat taller than in a *merra* of the same size. The *second anal spine* is stout, and exceeds the third one conspicuously in length. The caudal is much rounded, and the soft vertical fins moderately so, as in *merra*. The dark round spots are more crowded, so as to show little of any paler ground-colour; but instead thereof each spot is surrounded by six triangular specks of white, giving a somewhat hexagonal form to the meshes, though the dark areas are quite round. These spots exist on the caudal fin also, on the whole soft dorsal and anal, and the posterior part of the pectoral; but they are confined to the inferior halves of the spinous dorsal and fore-part of the pectorals; they are absent on the lower jaw and under surface of the fish from thence to the anus. The vestiges of spots of any kind are very faint on the ventrals. The dorsal and anal are edged with black.

RAYS:—B. 7 — 7; P. 16; V. 1|5; D. 11|15, the last one divided; A. 3|8; C. 15 $\frac{2}{3}$ .

This is much like the species sketched by Parkinson at Otaheite\*, where, as we learn by a note in pencil on the drawing, it is named 'tarao' or 'tarao opoppe.' "The ground-colour and the spots are darker, and softened into one another. Round about each spot there are small dots of white or straw-colour; the same across the fins. There is of this fish as large again." (Solander.) The spots on the body are coloured dark purplish-brown, those on the pectorals being redder. The figure shows twelve dorsal spines; the *third anal spine* is much the tallest, equalling the soft rays, and the lower jaw is longer than the upper one. The two latter characters disagree with *stellans*. *S. hexagonatus* (Cuv. & Val.), (*Perca hexagonata*, Forster),

\* Fig. No. 36. Parkinson; pl. 75, Banks. Libr. (*Perca maculata*); *Serranus Parkinsonii*, Cuv. & Val. ii. p. 239.

which is also said to bear the name of 'tarao' at Otaheite, has four large spots at the base of the dorsal, one large odd one before that fin, and another behind it; but in other respects it does not seem to differ much from *S. Parkinsonii*. *S. summana* has small white spots on the body and fins, but there is a conspicuous black mark on the tail, and the under edge of the preoperculum is finely denticulated.

DIMENSIONS.		inches. lines.	
Length from intermaxillary symphysis to tip of caudal .....	5	1	
base of ditto .....	4	2	
anus .....	2	8½	
tip of gill-cover.....	1	8½	
Height of body at beginning of dorsal .....	1	3½	
Thickness there .....	0	8	
Height of tallest dorsal spine .....	0	7¼	

### SERRANUS URA (*Cuv. & Val.?*), The Ura.

No. 27. Lieut. Emery's drawings.

*Ura*, a Japanese name (*Cuv. & Val. ii. p. 332*).

Lieut. Emery's portfolio contains a drawing of a *Serranus* captured at Depuch Island, which agrees tolerably well with the account of *S. ura* in the 'Histoire des Poissons.' The species was discovered by M. Langsdorf in Krusenstern's voyage on the coast of Japan.

In Lieut. Emery's drawing the body is represented as fuller and higher, and the dorsal spines as decreasing more in height as they approach the articulated portion of the fin, than in the other species closely allied to the *merra*. The depth of the body is equal to one-third of the total length, caudal included: the head forms one-third of the total length, caudal excluded. The middle opercular spine only is indicated in the drawing, and we therefore conclude that the others were inconspicuous in the recent fish. The third dorsal spine is the tallest, and is fully twice as long as the eleventh; it is about equal to one-third of the height of the body. The soft dorsal is one-fifth part higher. The second anal spine is stouter, but not so long as the third one. All the fins are rounded.

RAYS:—D. 11|14; A. 3|7; V. 1|5; &c.

It is possible that one or two soft rays may have been omitted in the drawing, as Lieut. Emery was not aware of the importance of enumerating them correctly.

The general colour of the fish is gamboge-yellow, which fades to white on the middle of the belly. The fins are a paler lemon-yellow. Yellowish-brown spots, roundish, but not very regular in form, are evenly distributed over the head, body, and fins. There are about six in a line between the gill-cover and caudal. On the fins and middle of the belly the spots are paler, and they are not so numerous on the pectorals, head, and under jaw as elsewhere. On the anterior part of the operculum they unite, to form an irregular blotch.

The length of the individual from which the drawing was made was seven inches.

## SERRANUS CRAPAO (Cuv. &amp; Val.), The Crapao.

*Serranus crapao*, Cuv. & Val. iii. p. 494.

*Crapao*, Malagese name. (Ditto.)

No. 1. Mr. Gilbert's collection.

Mr. Gilbert states that "this fish inhabits the shallow parts of Port Essington." The specimen possesses the characters ascribed to the *S. crapao*, which was taken by M. Reynaud in the roadstead of Batavia.

In general it bears a close resemblance to *S. Gilberti*, having the same very small scales on the under jaw, snout, and cheek. There exists, however, a cluster of minute scales on the maxillary, which I could not detect in *S. Gilberti*; the opercular scales are somewhat larger than in that species, and the under jaw is a little longer. The preoperculum is rather more rounded at the angle, there being no distinct lobe there, but merely a slight change in the curve embracing the five lower teeth. The upper limb is finely denticulated, the teeth becoming gradually larger towards the angle. Some very slight crenatures may be perceived on the lower limb. The middle opercular spine is flat and scarcely pungent, and more than its own length distant from the tip of the gill-flap. The upper and under spines are buried among the scales, and are but just perceptible. The interoperculum and suboperculum are perfectly entire. The spinous dorsal is even, and rather lower than the soft portion of the fin. The third and six following spines are of the same height; the two last are but very little shorter, and they are a little taller than the second, which is twice as high as the first. The *second anal spine* is rather stronger than the third one, but it is not so long by about one-eighth part. The vertical soft fins and the pectoral are about as much rounded as in the *S. merra*. The scales on the fins are likewise the same, but those on the body are rather more strongly ciliated. The dental surfaces of the jaws are more strongly brush-formed, forming pretty broad bands towards the symphysis; but on the limbs of the intermaxillaries the teeth are short, curved, and not very slender, and there is an exterior even row of short conical ones, not rising above the lips. On the limbs of the lower jaw the teeth are all curved, and longer and stronger than in *merra*, and there is no exterior row of conical ones. There are two or three canine teeth near the symphysis, above and below, not much stronger than the rest. The vomerine teeth are similar to those of the upper jaw, short, curved, and moderately strong. The palate bones have been cut away.

The colours of the dried skin have evidently faded greatly; but the whole body, the gill-covers, cheeks, and lower jaw appear to have been marked with dark spots, generally roundish, but not very exactly defined, nor disposed in any regular order. Their diameter is less than half that of the spots of *S. stellans*, and they are much less crowded. Four irregular blotches, of considerable size, range along the base of the dorsal. The anal and ventrals appear dark towards their tips, and traces of vertical bars or dark blotches are visible near the distal extremity of the caudal. There are also some dark shades on the top of the head and ascending limb of the pre-



operculum. Traces of spots remain on the vertical fins, but the spinous dorsal does not appear to have been tipped with black as in *S.merra* and *stellans*.

RAYS:—D. 11|14; A. 3|8; C. 15 $\frac{3}{4}$ ; P. 17; V. 1|5.

DIMENSIONS.		inches. lines.	
Length from intermaxillary symphysis to end of caudal .....	12	4	
base of ditto .....	10	3	
anus .....	6	6	
tip of gill-cover ...	3	10	
Length of pectorals .....	2	0	
ventrals .....	1	6	
caudal .....	2	1	
Height of third dorsal spine.....	1	1	
soft dorsal .....	1	4 $\frac{1}{2}$	
third anal spine .....	0	11	
soft anal .....	1	5 $\frac{1}{2}$	

No. 22, *Serranus punctulatus*, and No. 24, *Serranus marginalis*, of Mr. Gilbert's collection, were procured at Copang, in the island of Timor, and do not therefore come within the scope of this paper.

#### MESOPRION YAPILLI (*Cuv. & Val.*), The Yapilli.

*Yapilli*, Russell, pl. 95.

No. 21. Mr. Gilbert's list.

This fish is stated by Mr. Gilbert to be common in all the rocky parts of Port Essington, but he did not ascertain its appellation among the aborigines. The specimen was taken at the Tamar rock in November 1840.

The short characters of the Mesoprions noticed in the 'Histoire des Poissons' being strictly comparative, and turning much on the patterns of colour, are of difficult application when the naturalist has only a single species before him, and especially when the specimen is, as in the present instance, a solitary dried skin. All the particulars, however, which are mentioned in the work in question of the Yapilli are to be found in our specimen, and the resemblance of the fish to Russell's figure is very close.

The length of the fish is twenty inches, caudal included. The preoperculum has a slightly arched under-edge continuous with the rounded angle, which appears to project solely from the existence of the re-entering curve above it. The vertical limb is minutely toothed to within one-fourth of its upper end. The teeth are more acute in the sinus; and on the rounded angle and under edge of the bone, the teeth, though short, are wider, and are separated from each other by obtuse sinuses: two or three of the anterior ones are slightly inclined forwards. The thickening of the interoperculum opposite the preopercular sinus is very slight. The bony operculum ends in a flat, tapering, but obtuse lobe, whose lower margin is not concealed by the scales; a re-entering angle above its base forms the rounded upper corner of the bone into a minor and much shorter lobe. The membranous flap which tapers from the point of the operculum, but is

not acute, is supported by a cartilaginous prolongation of the suboperculum. The two rows of large supra-scapular scales are rendered very conspicuous by each of them being bounded anteriorly by a patch of small scales. The semioval projecting limb of the supra-scapular is minutely undulated on the margin. The edge of the humeral bone is entire. The pectoral has the pointed and tapering sparoid form, and reaches back nearly to the anal fin. The dorsal spines are strong, much compressed and acute, and the membrane is attached alternately to their right and left sides. The third anal spine is longer, and fully as strong as the second one; the first one is short, tapers suddenly to an acute point, and is furrowed anteriorly: these spines are also right and left. The soft dorsal and anal fins are rounded; their bases are scaly, and fillets of scales run between the rays for one quarter of their length: very short fillets of scales recline against the base of each spinous ray. The caudal is crescentic on the margin.

*Scales.*—There are about fifty furrows running to the basal edge and part of the adjoining lateral margins of each scale, the alternate ones being short, and the longer ones reaching nearly to the middle. The exposed surface of the scale is smooth to the touch, and its margin looks to be thin and membranous; but when examined through a lens the surface appears to be shagreened, or reticulated by minute obtuse eminences, and some very small and irregularly placed teeth may be discovered on the edge. Each scale is palé on the border and dark towards its middle, the dark tint occupying nearly the whole exposed surface of the scales above the lateral line, and becoming proportionally smaller and fainter on the sides, so as to be scarcely perceptible at the level of the pectorals. They produce longitudinal lines on the sides corresponding to the number of rows of scales.

*Teeth.*—Each limb of the upper jaw is armed with an even row of about twenty conical teeth, which are so short as to be concealed by the lips; and there are also two conspicuous canines close to each other near the symphysis. Behind these, on the whole length of the concave surface of the jaw, there is a narrow stripe of very short irregularly crowded teeth, which must have been almost concealed by the soft parts in the recent fish. Through a lens each of these minute teeth appears blunt, and answers better to the term '*dents grenues*,' used in the '*Histoire des Poissons*,' than to that of villiform. Each limb of the lower jaw is furnished with about eight strong conical teeth of unequal heights and unequally distributed, as if some had dropped out and were not yet replaced. The lateral ones are rather the tallest, but they do not equal the two upper canines, though they are much larger than the upper lateral teeth and project beyond the lip. The minute teeth of the lower jaw are restricted to a very small and not crowded cluster near the symphysis. A portion of the vomer which remains, and the edge of the anterior half of the palate bone, show a few microscopical teeth just protruding from the bone, which is however roughened by minute pits, apparently the sockets of teeth which have dropped out. The soft parts are entirely gone.

DIMENSIONS.		Inches. lines.	
Length from intermaxillary symphysis to	end of caudal .....	20	6
—————	base of ditto .....	16	4
—————	anus.....	10	2
—————	beginning of dorsal...	6	11
—————	tip of gill-flap .....	6	3
—————	centre of orbit.....	2	7
Diameter of orbit.....		1	0
Length of pectoral .....		5	2
—————	ventrals .....	3	4
—————	dorsal .....	8	10
—————	spinous part of dorsal.....	5	6
—————	articulated part of ditto .....	3	4
—————	anal.....	2	4
—————	caudal.....	4	2
Height of tallest dorsal spine (the 4th).....		2	6
—————	second and tenth spine of dorsal .....	1	3
—————	soft dorsal .....	2	3
—————	third anal spine .....	1	10
—————	soft anal .....	2	5
Length of space between anal and anus .....		1	0
—————	anal and caudal .....	2	9
—————	dorsal and caudal .....	1	10
Height of head at the nape .....		4	6

### MESOPRION CARPONOTATUS (Nob.), The Mungundju.

No. 20. Mr. Gilbert's list.

The native inhabitants of the shores of Port Essington call this fish 'Mungundju,' and it frequents the deep water in rocky places at the entrance of the harbour (Mr. Gilbert).

Cuvier mentions the resemblance between his Mesoprions and fish of the genus *Dentex* in external form. In the Mungundju the sparoid likeness is carried to the utmost by the rounded operculum, the almost entire preoperculum, and the dark spot at the base of the pointed pectoral. Indeed, until I had softened and extended the branchiostegous membrane so as to show its seven rays, and discovered some microscopical teeth on a small part of the edge of the palate bone, I had supposed that this fish might be the *Dentex cynodon* of the 'Histoire des Poissons.' As the Yapilli of the preceding article is the only Mesoprion that I have access to for the purpose of comparison with the Mungundju, the following description has reference throughout to that species.

*Form.*—Having a close general resemblance to that of Yapilli; but the lips, which in that species form a broad reverted fold on both jaws, are not so much developed in the Mungundju. There are no pores on the lower jaw of either, the integument being very smooth and nacreous. The preorbital in both has a perfectly even edge; and in Yapilli the thick integument passes so evenly from the surface of the bone, over the row of large scales which encircle the lower half of the orbit, as greatly to increase the apparent size of the bone: in the



Mungundju the posterior extent of the preorbital is defined, and the large suborbital scales partly hidden by a band of small scales which runs under the orbit and covers their bases. There are only six rows of scales on the cheek of the Yapilli beneath the large suborbital row, and all the convex surface of the preoperculum is naked: in the Mungundju there are seven rows of scales on the cheek and concave side of the preoperculum, and two rows of smaller ones on the middle of the convex limb of the bone, similar to those which exist in *Dentex vulgaris*; but in neither of the Mesoprions are the convex and concave faces of the preoperculum divided from each other by a distinct ridge, as in the *Dentex*. The whole surface of the interoperculum is clothed by four rows of small scales. In the Yapilli this bone exhibits only a single row of scales, which are larger than those on the cheek. The opercular scales are also larger than the cheek ones in this species; but in the Mungundju the difference between their sizes is scarcely perceptible. In the Yapilli, the scales of the suboperculum, which form a single row, gradually diminish in size as they approach the tip of the gill-flap, and thus expose the lower edge of the lobe of the bony operculum; but in the Mungundju all the scales of the row are of equal size, and they are tiled by the lower row of opercular scales so as to conceal the junction of the bones entirely. The two rows of large nuchal scales are rendered less conspicuous in the Mungundju by the patches of small scales before them being more extensive and encroaching over their bases. The scaly surface in this species also extends to opposite the middle of the orbit, while in the Yapilli it ends at the posterior angle of the eye, and does not come so far as the vertex. The lower edge of the preoperculum is much shorter than in Yapilli, and is quite entire; the angle is rounded and projects slightly, the ascending limb being undulated slightly without any distinct re-entering curve. Two or three irregularly scattered teeth are with difficulty discovered by the aid of an eye-glass about the middle of the vertical limb, and on the upper half of the rounded angle. The interoperculum is perfectly destitute of the very slight thickening which the Yapilli shows in the site of the tubercle of the *Diacopes*. The operculum is rounded, as in the sparoid family, with a shallow re-entering arc which divides the margin into two obtuse lobes, neither of them so wide as the arc itself. The membranous edge of the gill-flap is very narrow, and the tip of the suboperculum is not prolonged into an angular flap beyond the operculum. The supra-scapular has one small notch on its edge; the edge of the humeral can scarcely be perceived among the scales.

RAYS:—B. 7; D. 10|15; A. 3|10; C. 15 $\frac{4}{5}$ ; P. 14; V. 1|5.

The pectoral is pointed, but more suddenly acuminate, and considerably shorter than in the Yapilli; its point falls short of the anus. The spines of the dorsal are more slender, and the soft part of the fin is longer, not so high, and much less rounded than in the Yapilli. The last ray, both of the dorsal and anal, is small, and may be only a branch of the preceding one, so that fourteen and nine may be respectively enumerated; but as they are both distinct, and the fact cannot

be ascertained without removing the scales from their bases, they have been set down as 15 and 10. The anal is also lower, and its spines considerably softer than those of the Yapilli: the soft part is more obtusely rounded than in Yapilli. The caudal is slightly crescentic on the margin. The ventrals resemble those of Yapilli, but they are not so long, and the triangular scaly folds outside their bases are much smaller and less acute.

*Scales.*—The scales are smaller than in Yapilli, and more densely and less regularly tiled. The structure of the lateral line is alike in both. Each scale is roundish or quadrangular, with the corners rounded off: the exterior margin is finely toothed, the adjoining surface rough, and the basal half marked by about eighteen furrows, which produce crenatures on about one-third of the margin of the scale. There are about sixty-eight scales in a longitudinal row between the gill-opening and caudal fin. Short fillets of scales recline against each dorsal spine as in Yapilli, and the bases of the articulated parts of the dorsal and anal, and of the caudal, are scaly, precisely as in that fish.

*Teeth.*—The dentition is very similar to that of Yapilli. There are three canines crowded on one side near the symphysis, and about fourteen short conical ones in the exterior row beneath the lip. The minute teeth on the concave surface of the jaw are more acute, and merit the name of villiform better than in Yapilli: the cluster of minute teeth near the symphysis of the lower jaw is longer and more crowded. The eight outer conical teeth in that jaw exist as in Yapilli, but they are followed by five smaller and closer ones in the same row, which are not present in that species. The vomer has been cut away; but a small projecting lobe of the edge of the palate bone is rough with minute setaceous teeth, which may be readily felt with the finger, yet cannot be seen by the unassisted eye.

*Colour.*—The back of the dried specimen has a darkish and somewhat clouded tint, which gradually fades on a level with the upper edge of the pectorals into the pale and spotless under surface. All the fins are pale and unspotted, and seem as if they had been yellow or orange-coloured when fresh. The remains of a yellowish tint prevails on the caudal and extends to its scaly base. A dark spot girdles the base of the three upper pectoral rays, and there seems to have been another on the lower lip, near the symphysis.

DIMENSIONS.		inches.	lines.
Length from intermaxillary symphysis to end of caudal .....	14	0	
————— base of ditto.....	2	9	
————— anus.....	7	6	
————— beginning of dorsal...	4	11	
————— tip of gill-flap .....	3	10	
————— centre of orbit.....	2	2	
Diameter of orbit.....	0	10½	
Length of pectoral .....	2	10	
————— ventral .....	2	10	
————— whole dorsal .....	5	8	
————— spinous part of ditto .....	3	3	
————— articulated part of ditto .....	2	5	

	inches.	lines.
Length of anal.....	1	6
caudal .....	2	9
Height of tallest dorsal spine (4th) .....	1	4
second spine .....	1	1
tenth dorsal spine .....	0	9 $\frac{1}{2}$
soft dorsal .....	1	1
anal .....	1	4
third anal spine .....	0	8
Length of space between anus and anal fin .....	0	9 $\frac{1}{2}$
anal and caudal .....	1	9
dorsal and caudal .....	1	1
Height of head at nape .....	3	4

[To be continued.]

IV.—*Descriptions of several new species of Nudibranchous Mollusca found on the coast of Northumberland.* By JOSHUA ALDER, Esq., and ALBANY HANCOCK, Esq.

DURING two short periods of residence at Cullercoats last summer, we devoted some leisure time to an examination of the Nudibranchous Mollusca of the coast, for the purpose of ascertaining the number of indigenous species, and of observing the habits and œconomy of these little-known animals. In the former respect our success was beyond our most sanguine expectations. Although our researches were confined to a very small portion of the coast, not exceeding two or three miles, in the immediate neighbourhood of Cullercoats, and without the assistance of a dredge in collecting the deep-water kinds, we succeeded in obtaining thirty-four species, a number nearly equal to what has yet been recorded as inhabiting the whole of the British seas. Of this number about one half are entirely new. Careful drawings of the whole have been made while in a living state, which, together with more full descriptions than are now offered, may be given to the public at some future time, when further investigation shall have enabled us to clear up some points in their history of which we are at present in doubt, and perhaps to increase the list by the discovery of additional species. In the mean time we take the liberty of sending for insertion in the 'Annals' short characters of seventeen species which appear to be undescribed.

The most interesting point of physiology that we have observed in this tribe is the existence of eyes in *Doris* and *Goniodoris*, genera that have hitherto been described as entirely devoid of these organs; they can be most distinctly observed in young individuals, where the skin is very transparent. In this state we have succeeded in detecting them in *Doris repanda* and *Goniodoris nodosa*, situate behind the dorsal ten-